



THE UNIVERSITY of TEXAS  
HEALTH SCIENCE CENTER AT HOUSTON

James T. Willerson, MD  
*Edward Randall III Chair in Internal Medicine*  
*Alkek-Williams Distinguished Professor*

Office of the President 713 500 3010  
7000 Fannin Street, 17<sup>th</sup> Floor 713 500 3059 fax  
Houston, Texas 77030  
James T. Willerson@uth.tmc.edu

September 1, 2006

The Honorable Tom Coburn, M.D.  
United States Senate  
Washington, DC 20510-3604

Dear Senator Coburn:

I am pleased to provide a response to your letter asking for information on federal appropriations received by The University of Texas Health Science Center at Houston. I appreciate your desire to gather information on the benefits of the federal earmark practice and hope that the information included in this response is helpful to you.

I have attached a document outlining your questions numbered 1 and 2 for each specific appropriation received by The University of Texas Health Science Center at Houston. Below are responses to questions 3, 4, 5 and 6. These responses apply to all of the appropriations projects reported in the attached document.

Question 3 – Measures and standards for quality and outcomes for programs receiving assistance through earmarks or appropriations.

The University of Texas Health Science Center at Houston applies strict standards to all research programs and is committed to ensuring the ethical and efficient use of research dollars, whether they be federal earmark, federal grant, state or local dollars. You may wish to refer to our extensive research policies as published on our website [www.uth.tmc.edu/research](http://www.uth.tmc.edu/research).

Question 4 – Stated policy regarding Congressional earmarks or appropriations.

We have no specific policy related to congressional earmarks or appropriations. However, we consider ourselves to be excellent stewards of the funds granted to us no matter the source. We consider it a privilege to receive federal appropriations and will continue to propose projects that

we, in coordination with The University of Texas System, believe are worth the investment by the United States Congress.

Question 5 – Lobbyist assistance in obtaining federal funds for research.

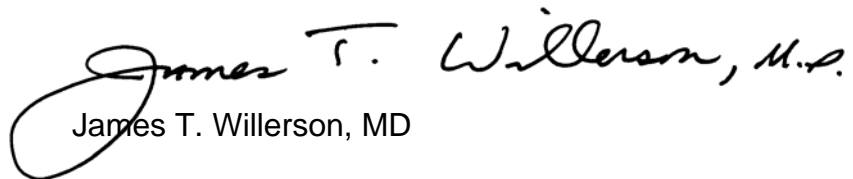
The University of Texas Health Science Center at Houston does not retain outside lobbyists to assist with either research or advocacy related to federal appropriations requests.

Question 6 – Academic and other contributions of congressionally earmarked funds.

It is the experience of this institution, and my opinion that congressional earmarked funds have had significant substantive impact on our academic institution, as well as on the health and welfare of society as a whole. A review of any one of the programs attached will show not only value to our academic endeavors, but also the passionate desire and premier abilities of our researchers and collaborators to contribute to the health of the public at large. This is our mission and we work with the utmost dedication to be successful and responsible in our charge.

Thank you for the work you do in the United States Senate. We appreciate all of the federal dollars we receive through the work of the Congress. If you would like any additional information on the responses included herein, please feel free to contact me directly or to call Sabrina Midkiff, Chief Governmental Relations Officer, at 713-500-3015.

Respectfully yours,

A handwritten signature in black ink that reads "James T. Willerson, M.D.". The signature is fluid and cursive, with a large loop at the beginning of the first name.

James T. Willerson, MD

CC: The Honorable Kay Bailey Hutchison  
The Honorable John Cornyn  
Chancellor Mark G. Yudof  
Vice Chancellor Kenneth I. Shine, M.D.  
Vice Chancellor William Shute  
Michael McKinney, M.D.  
S. Ward Casscells, M.D.  
Joe McCormick, M.D.  
Mauro Ferrari, Ph.D.



THE UNIVERSITY *of* TEXAS

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HEALTH SCIENCE CENTER  
AT HOUSTON

**Federal Appropriations**

**The University of Texas Health Science Center at Houston**

**Prepared in response to Senator Tom Coburn, M.D.**

**September 1, 2006**

### **Alliance for NanoHealth**

The Alliance for NanoHealth is administered by The University of Texas Health Science Center at Houston and is a research consortium of seven institutions including: The University of Texas M.D. Anderson Cancer Center, The University of Texas Medical Branch at Galveston, The University of Houston, Rice University, Baylor College of Medicine, and the Texas A&M Health Science Center.

#### **1. Appropriations received by the Alliance for NanoHealth from FY 2000 to present:**

FY 2005 – Department of Defense	\$2.8 million
FY 2005 – Energy and Water	\$0.6 million
FY 2005 – Labor – HHS	\$1.0 million
FY 2005 – VA-HUD	\$2.0 million
FY 2006 – Department of Defense	\$2.1 million
FY 2006 – SSCJ/NASA	\$4.0 million

#### **2. Summary of goals, accomplishments for the Alliance for NanoHealth appropriations:**

The Alliance for NanoHealth (ANH) was conceived in 2004 as the first multi-disciplinary, multi-institutional collaborative research endeavor aimed solely at using nanotechnology to facilitate congruity between medicine, biology, materials science, computer technology and public policy. The mission of the Alliance is to collectively bridge the disciplines to catalyze nanotechnology-based solutions to unresolved problems in medicine through clinical translation. Its principal goal is to provide new clinical approaches to saving lives through the commercialization of technologies focused on improved diagnosis, treatment, and prevention. The Alliance is currently governed under a multi-institutional operating agreement that is lead by biomedical nanotechnologist Dr. Mauro Ferrari.

The ANH comprises seven world-class research institutions that form the world's largest collection of healthcare facilities (Texas Medical Center) located in the greater Houston, Texas region. Member institutions include the Baylor College of Medicine, The University of Texas M.D. Anderson Cancer Center, Rice University, the University of Houston, The University of Texas Health Science Center at Houston, Texas A&M University and The University of Texas Medical Branch at Galveston.

ANH institutions are committed to develop and apply nanotechnology tools in the battle against heart disease, cancer, diabetes, stroke, and infection. The success of the Alliance is attributed to the "Super-Institutional" opportunities that are made possible through the consortium. Simply speaking, the Alliance provides investigators access to the grander, multi-institutional technology portfolio and facilities to seed innovative collaborative

research that enables institutions to seek and qualify for significantly larger funding opportunities than if pursued individually.

The ANH defines “nanohealth” as understanding and addressing the molecular origins of diseases that originate within a human cell and applying nanotechnology’s power to control individual molecules to the detection, diagnosis, and treatment of these debilitating and incurable illnesses.

Nanotechnology is the manipulation of materials at the molecular level where unique phenomena can enable novel applications. The prefix “nano” in the term nanotechnology refers to a nanometer, one-billionth of a meter, which is approximately a 100,000 times smaller than the width a human hair. Nanotechnology provides the greatest potential for both the discovery and invention of new pharmaceuticals and devices to develop an improved paradigm of healthcare that is designed for the individual patient.

The institutional members of the Alliance for NanoHealth are passionately dedicated to finding the cures, technologies, treatments, and clinical practices to combat the diseases of our time. To do so, we must stretch beyond the tools available to us today and begin to lay the foundation for the future of medicine with tomorrow’s scientific breakthroughs in mind. The successful development of nanotechnology – the ability to manipulate materials on an atomic or molecular scale – is one such breakthrough that has the remarkable potential to provide doctors with new solutions for fighting disease. Something so small as the *nano-scale* may just be our best bet for making a significant impact on medicine.

The purpose of the Alliance for NanoHealth (ANH) is to establish the Houston region as the world leader in translating nanotechnology discovery into novel clinical applications. This multi-institutional collaborative endeavor is focused upon the disbursement of resources for:

- Development of core facilities equipped with “state-of-the-art” instrumentation accessible by members from all seven participating ANH institutions;
- Proof-of-concept seed grant support for “super-institutional” efforts focused upon the most cutting-edge, high risk research projects;
- Recruitment of new faculty and research personnel that bring unique skills that can contribute to the development of biomedical nanotechnologies.

#### Utilization of FY 2005 Federal Funds

The \$2.0M VA-HUD/NASA earmark is currently supporting a joint research program between The University of Texas Health Science Center at Houston, Rice University, and NASA JSC for the development of carbon-based nanomaterials for spaceflight healthcare applications. Accomplishments include:

- Ten peer-reviewed journal articles (2 published, 5 submitted, 3 in preparation).

- Three USPTO patents filed, and a number of invention disclosures in process.
- Development of future NIH & NSF proposals for continued research.

The \$1.0M Labor-HHS earmark and the \$.06 million DOE earmarks are being utilized for equipment and build-out of the University of Houston's new clean room. The project is currently in the schematic design phase; however, the equipment will be procured, received, and installed prior to the project expiration date in 2009.

The \$2.8M DoD earmark is expected to be received and released before the end of the 2006 calendar year. The actual disbursement will be partitioned towards the funding of seed grant awards and administrative core of the Alliance for NanoHealth.

### Seed Grant Program

In 2005, the Alliance for NanoHealth invited ANH principal investigators to apply for innovative seed grants to support proposals in the field of nanotechnology relating to health issues. The objective was to bring advancements in nanotechnology such as nanomaterials, tools, devices, fabrication, analytics, monitoring, sensing, modeling, etc., toward solutions for clinical needs.

Cross-disciplinary, inter-institutional collaborations among investigators in the areas of nanotechnology, computational resources and clinical needs were required. These research seed projects were intended to catalyze the formation of many new *high-risk exploratory projects* and to advance not previously funded inter-disciplinary collaborations toward achieving extended funding through additional, external resources.

The applicant response exemplified the level of excitement surrounding nanomedicine in the greater Houston region. Over 60 letters of intent were received, out of which 35 projects were chosen to submit full proposals. In the end, an external review committee divided approximately \$2.0M to the top 10 seed grant proposals. Below are brief descriptions of each seed grant award presented in alphabetical order by the principal investigators' (PI) last names.

**1) Title: Nanorods-mediated gene therapy in bladder cancer**

Principal Investigator: Liana Adam, MD, PhD.

Institutions Involved:

Department of Physics and Astronomy, Rice University

Department of Urology, M.D. Anderson Cancer Center

Department of Cancer Biology, M.D. Anderson Cancer Center

**2) Title: Self-assembling peptide-amphiphile nanofibers as a scaffold for dental stem cells**

Principal Investigator: Jeffrey D. Hartgerink, PhD

Institutions Involved:

Department of Chemistry and Bioengineering, Rice University  
Department of Orthodontics, UT Health Science Center at Houston

**3) Title: Biomodally-targeted, magnetically-responsive nanoparticles as drug carriers**

Principal Investigator: Jim Klostergaard, PhD  
Institutions Involved:  
Department of Molecular & Cellular Oncology, M.D. Anderson Cancer Center  
Department of Internal Medicine, Oncology, UT Health Science Center at Houston  
Sealy Center on Structural Biology, UT Medical Branch  
Aptamed, Inc., UT Medical Branch startup  
NanoBioMagnetics Inc.

**4) Title: Feasibility of selective laser elimination of leukemia cells targeted with gold and silver nanorods**

Principal Investigator: Marina Konopleva, MD, PhD  
Institutions Involved:  
Department of Blood and Marrow Transplantation, M.D. Anderson Cancer Center  
Department of Bioengineering, Rice University  
Fairway Medical Technologies, Inc.

**5) Title: On-command control of blood pool residence time for nanoparticle-based molecular imaging**

Principal Investigator: Vikas Kundra, MD, PhD  
Institutions Involved:  
Department of Diagnostic Radiology, M.D. Anderson Cancer Center  
School of Health Information Sciences, UT Health Science Center at Houston

**6) Title: Nanomagnetic biosensor array for few-cell cancer diagnostics**

Principal Investigator: Dmitri Litvinov, PhD  
Institutions Involved:  
Department of Electrical and Computer Engineering, University of Houston  
Department of Chemical Engineering, University of Houston  
Department of Cancer Genetics, Chemical & Biomolecular Engineering, M.D. Anderson Cancer Center

**7) Title: Guided microvascular formation and cellular infiltration for tissue regeneration applications in nano-structured silk fibroin-chitosan scaffolds**

Principal Investigator: Anshu B. Mathur, PhD

Institutions Involved:

Department of Plastic and Reconstructive Surgery, M.D. Anderson Cancer Center

Department of Bioengineering, Rice University

Center for Biomedical Engineering, M.D. Anderson Cancer Center

**8) Title: Nano-therapeutics to enhance wound healing**

Principal Investigator: Joan E. Nichols, PhD

Institutions Involved:

Department of Internal Medicine, UT Medical Branch

Department Chemistry, University of Houston

Department of Chemical Engineering, University of Michigan

**9) Title: Modulation of inner ear nanomechanics**

Principal Investigator: John S. Oghalai, MD

Institutions Involved:

Department of Otolaryngology, Baylor College of Medicine

Department of Bioengineering, Rice University

**10) Title: Development of asymmetric liposomal nanoparticles for targeted delivery of siRNA to silence cyclin D1 expression and tumor regression in hepatocellular carcinoma**

Principal Investigator: Sundararajah Thevananther, PhD

Institutions Involved:

Department of Pediatrics, Baylor College of Medicine

Department of Chemical Engineering, University of Houston

Department of Civil Engineering, University of Houston

**Utilization of FY 2006 Federal Funds**

The amounts of \$220K and \$300K have been allocated for the purchase of shared equipment such as a high resolution electron microscope (Baylor College of Medicine) and an advanced optical imaging system (MD Anderson Cancer Center) respectively. These systems will participate as ANH Core Technology Facilities that will contribute to establishing the infrastructure required to facilitate collaborative and interdisciplinary research.



The remaining \$6.0M will be allocated towards the development, infrastructure, and equipment for a shared semiconductor bio-nanotechnology facility. The costs attributed to the build-out of this one-of a-kind Technology Core Facility include:

- Build-out of ~10,000 square foot of laboratory space for chase & clean room design
- Ultra-pure air handling system (Class 100)
- Photolithography bay and associated equipment
- Dry/wet etching bay and associated equipment
- Thin film growth bay and associated equipment
- Wafer bonding and mask production bay and associated equipment
- Characterization bay and associated equipment

The Alliance for NanoHealth has a specific “Accountability Policy” implemented by its President and Steering Committee that requires annual reporting on the progress of scientific research, use of federal dollars and status of contracts with federal agencies. These reports are submitted on a prescribed form and monitored by Alliance for NanoHealth leadership.

## **DREAMS™ Program**

DREAMS™ (Disaster Relief and Emergency Medical Services) was a U.S. Army-sponsored program led by The University of Texas Health Science Center at Houston, Texas A&M University, Texas Heart Institute, and Memorial Hermann Hospital.

1. **Appropriations received by the DREAMS™ Program:** Actual contracted amount resulting from federal Department of Defense appropriations to UTHSC-H was \$13,064,198 from 1997 – 2003.

### **2. Summary of Goals, Accomplishments for the DREAMS™ appropriations:**

The Dreams program was aimed at improving health care in emergencies, both on the battlefield and in civilian life. It took advantage of Houston's high incidence of medical emergencies and surgical trauma, including natural disasters and industrial accidents, to test the latest technologies for emergency care. The work was divided into three broad areas: **Digital EMS** (Emergency Medical Services), **Chemical Warfare Defense**, and **STAT** (Science Triage and Treatment), a program aimed at improving the diagnosis and treatment of tissue injuries.

**Digital EMS:** The Digital Emergency Medical Services (Digital EMS) program developed wireless video communications and combined Global Positioning System (GPS) technology and advanced software to enable ambulances and helicopters to reach, diagnose and treat victims sooner on the scene. It also coordinated helicopters and ambulances to minimize transport time to the nearest appropriate facility, using continuous communication with these facilities and Houston's Intelligent Highway System.

**Chemical Warfare Defense:** DREAMS™ colleagues at Texas A&M succeeded in developing new sensors and counter measures for chemical and biological weapons, some of which have recently been deployed by NATO.

**Science, Triage and Treatment (STAT):** The STAT program complimented the Digital EMS and Chemical Warfare Defense Programs by focusing on the basic and applied sciences that enabled us to better diagnose and treat injuries.

The DREAMS™ program has resulted in numerous **discoveries, inventions, and improvements** in public awareness. Some examples are:

- 1) The Defense of Houston website: Prompted by the Sept. 11 terrorist attacks in New York and Washington, Defense of Houston was formed on Sept 16 as an ad hoc, self-appointed, but broadly representative committee of Houstonians who hope to optimize the city's preparation for disasters in general, and terrorism in particular. The group includes leaders of most industries, civic groups, and government agencies, and experts on natural disasters, terrorism, intelligence, diplomacy, biological and chemical threats,

telecommunications, civil liberties, and emergency medical response. The website was honored with a “Best Practice in Public Health Award” by Dr. Eve Slater, the U.S. Assistant Secretary for Health.

2) The automatic external defibrillator (AED) project that led to AEDs being installed in businesses, churches, civic groups, apartment houses, medical offices, and clubs.

3) The Houston Task Force for Counter-terrorism: Ambassador Ed Djerejian, Director of the James A. Baker, III Institute for Public Policy at Rice University, has taken the lead in organizing this task force, which includes the Mayor, FBI leaders, public health officials and presidents of the leading institutions in The Texas Medical Center.

4) When Tropical Storm Allison hit Houston in 2001, it was the DREAMS<sup>TM</sup> team, led by Dr. S. Ward Casscells, that responded in earnest and saved many lives. The flooding caused all electricity and backup generators to fail and critically ill patients had to be evacuated quickly. Dr. Casscells was honored with the Memorial-Hermann Healthcare System Hero of the Flood Award for his heroic efforts.

5) DREAMS<sup>TM</sup> has successfully launched several **companies**:

a. **Intelligent Diagnostics, Inc./AskRed.com**, a web site that helped to rapidly evaluate a person’s symptoms and decide whether to monitor symptoms, seek a physician appointment or make an immediate visit to an emergency room.

b. **Telemedicus Inc.**, formed to commercialize telemedicine systems, both fixed and mobile, for transmission of bi-directional audio, video and biometric data between a remote unit and a physician.

c. **Volcano Corporation**, a publicly traded company focused on the discovery, development, and commercialization of projects for the detection and treatment of atherosclerosis and vulnerable plaques in the coronary and peripheral vascular systems.

6) The DREAMS<sup>TM</sup> ambulance, an interactive digital ambulance developed to aid in disaster relief and response, is a mobile platform using computer and telecommunications technology and research in basic and clinical sciences to improve trauma victims' survival, particularly in isolated areas and combat zones. After Hurricane Katrina and, one month later, after Hurricane Rita, emergency medical responders were able to road test these technologies in conditions for which they were developed.

DREAMS<sup>TM</sup> has been a successful public-private partnership. It has funded a program too broad for the mandate of the National Science Foundation (NSF), too high-risk for the mandate of the National Institutes of Health (NIH), and not “risky enough” for the mission of Defense Advanced Research Projects Agency (DARPA).

**The Texas Training and Technology Against Trauma and Terrorism (T5) Program**

In response to a November 2001 request by Army Secretary Thomas White that the U.S. Army Medical Research and Materiel Command (USAMRMC) consider expanding the Disaster Relief and Emergency Medical Services (DREAMS<sup>TM</sup>) project, USAMRMC responded with a proposal which outlined an integrated program in chemical and biological terrorism and trauma, with special emphasis on training and research in related biosciences and telecommunications. USAMRMC subsequently conducted a site visit to The University of Texas Health Science Center at Houston in order to perform a cost benefit analysis on the construction of a Bio-Research and Bio-Terrorism Training Center in Houston, Texas. The conclusion was that The University of Texas Health Science Center at Houston objectives fit well into a broader TATRC plan to configure a number of U.S. Army-managed, congressionally-funded programs into a Homeland Defense Advanced Medical Technology Network. The Texas Training and Technology Against Trauma and Terrorism (T5) program was launched in 2004 with the goal of identifying the best ways of protecting Houston and other cities from the morbidity, mortality, and financial impact of terrorism and natural disasters

**1. Appropriations marked for the T-5 Program:** Total Department of Defense appropriations for the entire T5 program is \$11 million per year for three years (2004 – 2007).

**2. Summary of goals, accomplishments for the T-5 Program:**

The Texas Training and Technology Against Trauma and Terrorism (T5) program was launched in 2004 with the goal of identifying the best ways of protecting Houston and other cities from the morbidity, mortality, and financial impact of terrorism and natural disasters.

No other comprehensive program will combine the technology, medical expertise, fundamental science, and training that encompass T5. As part of the program, training and education as well as predictive strategies will be explored to enhance disaster response. Diagnostic and therapeutic measures will be developed to assess and treat injury and disease. Fundamental scientific research will also be performed in order to better understand the physiological response to injury and disease.

The ultimate goal of the T5 program is to solve a wide variety of public health, scientific, and medical issues that will eventually lead to enhanced community preparedness. Through the direction of Dr. S. Ward Casscells, III, and other leaders of the Texas Medical Center, T5 will provide this blueprint, which other cities will use to better prepare their communities for public health disasters.

The T5 program has resulted in numerous accomplishments, discoveries and improvements. Some examples are:

1) Public health informatics surveillance technology -- Domain knowledge (in form of

formal ontologies), well studied logic systems (e.g., Description Logic) and Semantic Web technology automate and enable collaboration in multidisciplinary, diverse and distributed environments such as web, in order to enable public health preparedness and situational awareness.

In this project, emergency room visit data consisting of triage data, nurse notes, physician notes, medications, interventions, physical exams, previous history, etc. are submitted in real-time from the largest healthcare provider systems from the Houston metropolitan area (accounting for more than 30% of all ER visits at Houston). There is also an hourly transmission of air quality measurements from the Texas Commission on Environmental Quality (TCEQ) from 12 regions corresponding to the greater Houston area (Harris, Fort Bend, and Galveston counties).

2) Development and implementation of training modules:

- Educational tools for the public and private sectors on such topics as disease control and detection, risk communications, disaster response, laboratory readiness and emergency planning.
- War surgery skill development course designed for deployed surgeons of the military that focus on specific surgical skills that can be immediately applied to the combat trauma setting.

3) Epidemiological-based West Nile Virus (WNV) surveillance -- In order to improve the current assays for detecting WNV infection and other important emerging arboviruses, researchers are increasing the number of sites for clinical laboratory-based surveillance and developing more rapid methods of testing.

4) Understanding strain virulence in anthrax spores -- Anthrax is considered to be among the microorganisms with potential use as a biological weapon in a terrorist or military act. Researchers are studying the molecular basis for penicillin-resistance in *B. anthracis* as antibiotics represent the only existing therapeutics for anthrax.

5) Minimally invasive monitoring devices for early detection of heart disease -- This research is the next step in a series of research studies that began with the finding that hypothermia appears to be a powerful, yet novel, univariate and multivariate predictor of imminent death in hospitalized Heart Failure (HF) patients.

6) Clinical trial for early stage non-invasive disease detection -- The incidence of coronary artery disease is greater in patients with calcific deposits than in those without. These scientists derived and tested an algorithm for the assessment of roughness of calcific deposits in human coronary arteries as imaged three-dimensionally by computed tomography (CT).

The subsequent relationship with General Electric helped lead to the formation of the Center for Advanced Biomedical Imaging Research (CABIR), a public-private partnership between two sister institutions, UT Health Science Center and UT MD

Anderson Cancer Center, and a corporate partner in GE Healthcare, who is providing more than \$30M in medical imaging equipment.

Through the work performed within the T5 program, Houston will become well prepared for the adverse effects of terrorism and natural disasters.

## **TexSHIELD™ Program**

The Texas Science Humanitarian Intervention, Education and Leadership for Disasters (TexSHIELD™) is a disaster preparedness program with focus on pandemic influenza.

**1. Appropriations marked for the TexSHIELD Program:** Department of Defense funding for fiscal year 2006 is \$5.7 million.

**2. Summary of goals, accomplishments for the TexSHIELD Program:**

TexSHIELD™ utilizes the research and educational programs of The University of Texas Health Science Center at Houston and adds a disaster medicine “strike force” and surge capacity that has assisted in most of the natural and terrorist disasters of the past decade. For 2007, TexSHIELD™ has developed an integrated research and training program to ensure our Nation’s leaders, soldiers and citizens are educated and equipped with state-of-the-art disease surveillance and laboratory technology to prevent and control an outbreak of pandemic influenza both domestically and abroad. Days to weeks of advanced notice related to avian influenza may be achievable as a result of this project.

**TexSHIELD™ Laboratory:** Blood and sputum are collected from a broad network of various (proposed) local, national and international partners for analysis at the TexSHIELD™ laboratory. Sputum samples are processed two ways: (1) rapid, high-throughput DNA fingerprinting of human and avian influenza viruses by TIGER Biosensor, a novel disease detection technology derived from a DoD/DARPA-sponsored program (*hours*), and (2) through classic viral culture (*days*). Blood samples and viruses are banked for retrospective epidemiological research studies and for availability of isolated viral strains to become possible vaccine candidate seed lots if requested by CDC/NIH and DHHS collaborators.

**TexSHIELD™ Influenza Surveillance Network:** The TexSHIELD™ influenza network includes the Texas Department of State Health Services (DSHS), partners, private and public regional laboratories, point of care laboratories and clinicians. It includes participants from all parts of the state and from all high-risk areas. The TexSHIELD™ influenza surveillance strategy works to enhance early reporting by increasing the likelihood that health providers will detect influenza in the office environment and notify proper authorities. It also ensures that laboratory samples of influenza virus are rapidly transported and tested in our TexSHIELD™ laboratory. Sentinel surveillance sites throughout Texas will be created to monitor the onset of influenza in the population. Results are conveyed in a composite report on a weekly basis and will be disseminated throughout Texas, to the Federal government and to all partners within the TexSHIELD™ surveillance system.

**TexSHIELD™ Influenza Situational Awareness and Decision Support:** The Influenza Situational Awareness and Decision Support engine creates informatics solutions for influenza situational awareness by developing a state-of-the-art integrated information collection and communication platform that provides a unified and central

view to all ongoing surveillance, laboratory, and research activities. It evaluates real-time data from all emergency department visits from the Memorial Hermann Healthcare System (MHHS), and other partners that query large groups. Proposed future partners are Google, WebMD, Zogby International, and Wal-Mart pharmacy services. Chest pain centers also will integrate data on real-time cardiovascular events for the presence of increased indicators of myocardial infarctions (MIs) or Sudden Cardiac Death (SCD). Previous studies have shown that the influenza virus is a major trigger for heart attacks. Overall, the platform ensures a collaborative environment that is vital for influenza preparedness, where a multiplicity of agencies from different domains, expertise, authorities, information requirements, and priorities will obtain, communicate and share real-time, accurate and unambiguous information.

**Future Research Component:** Banked influenza viral specimens in Houston's most vulnerable populations will undergo epidemiologic and laboratory characterization and fingerprinting. Look-back studies will also be conducted.

**KEY OUTPUTS** as a result of early detection are:

- **ALERTS AND RESPONSE** – Distribute just-in-time educational alerts (*social distancing, hand-washing/hygiene, and restrictions on travel or goods*), masks, and antivirals to contain and extinguish the outbreak.
- **FASTER VACCINE DEVELOPMENT** – Expedited identification (*by up to two weeks*) of a pandemic influenza strain through this program should enable TexSHIELD™ collaborators to use these specimens to accelerate vaccine development.
- **ANTIVIRALS** - Patients who are exposed to influenza and survive generate antibodies or immunoglobulin (IgG). Banked blood samples and DNA from the sources used to characterize influenza virus in the TexSHIELD™ laboratory will be analyzed for the presence of IgG. The IgG will be purified, sequenced and licensed for manufacture. This product could be used as a prophylaxis or treatment for patients who are resistant to anti-influenza drugs such as Amantadine and Tamiflu, or if those drugs are not available. TexSHIELD™ scientists also are evaluating several anti-inflammatory drugs (in current use for other purposes) for anti-influenza activity, (including NO, in collaboration with Nobel Laureate Ferid Murad, M.D., Ph.D.)

The TexSHIELD™ Laboratory, Influenza Surveillance Network, Influenza Situational Awareness and Decision Support and Research Components serve to educate Texas and government leaders, health departments and public health officials, healthcare institutions and providers, scientists, students, and the general public to achieve readiness for a pandemic related to influenza.

**Why The University of Texas Health Science Center at Houston:** As exemplified in the DREAMS™ (Disaster Relief and Emergency Medical Services) and T5 (Texas



Training and Technology Against Trauma and Terrorism) programs, The University of Texas Health Science Center at Houston has been a leader in disaster medicine, Army medicine, and international infectious diseases for a decade, and has led in the development of veterinary surveillance (e.g., West Nile encephalitis) as well. The university's information technology program has led to award-winning advances in situational awareness, which have been field-tested in Hurricane Katrina and shown to detect outbreaks two weeks faster than CDC.

TexSHIELD™ researchers were also the first to identify the risk of influenza as a potential bioterror weapon, and to discover that flu can trigger heart attacks and strokes.

The program leverages the complementary strengths of many strategic partnerships such as the BL4 laboratory at The University of Texas Medical Branch, the Nobel Prize-winning antioxidant, antimicrobial work of Ferid Murad, M.D., nanosensor innovations at the Alliance for NanoHealth, world-renowned veterinary medicine at Texas A&M University, and the Texas homeland security network and the nation's foremost biosecurity training program, both led by former CDC bioterrorism leader Scott Lillibridge, M.D.

The City of Houston is considered by the FBI as a likely terrorist target: it is the energy capital of the world and its port is #2 in international tonnage. However, with leaders in infectious diseases, informatics, international public health, and disaster medicine, The University of Texas Health Science Center at Houston is uniquely positioned to develop – within the year – the world's leading program in early detection and response to avian influenza, and to facilitate inter-agency and public-private coordination in prevention and response. Millions of lives may well be saved. The University of Texas Health Science Center at Houston has taken active steps to network and partner with former and current DoD and CDC and DHHS officials, and the Principal Investigator has even joined the Army Reserves. He has gained front-line military medical experience and practical insight as to how to better develop The University of Texas Health Science Center at Houston expertise and technology to offer better protection to Texans and Americans through a thorough understanding of Federal Agencies' capabilities and infrastructures and constant alertness to opportunities to allow TexSHIELD™ to provide synergy and leverage with other Federal and State medical infrastructures.

## **Lower Rio Grande Valley/Hispanic Health Cohort Study**

**1. Appropriations marked for the Lower Rio Grande Valley/Hispanic Health Cohort Study:** Received \$500,000 in 2005 from Centers for Disease Control.

## **2. Summary of Goals, Accomplishments for the Lower Rio Grande Valley/Hispanic Health Cohort Study:**

The Hispanic population is the largest and most rapidly growing minority in the United States. Until recently, data from Hispanic populations has been grouped with 'all whites', masking marked disparities. We are now realizing that there are notably higher rates in Hispanics of diabetes, obesity, asthma, tuberculosis, certain cancers such as liver cancer and cancer of the cervix, and other conditions such as fatality from accidents. Causes are multiple, and include cultural, socioeconomic, education and even genetic factors. Human and financial inequalities limit our ability to fight disease in Hispanics. Nowhere are these disparities more pronounced than in the Lower Rio Grande Valley (LRGV) of South Texas.

Texas border cities are among the fastest growing communities in the nation, but per capita income is only half that of the rest of the U.S.<sup>1</sup>. The costs of health care, however, are virtually the same in a population, almost half of whom are uninsured. The proportion of per capita expenditure for health care in the LRGV is over twice that in the rest of the U.S. Together, poverty, rapid growth and poor health place a terrible economic burden on local businesses and private and public health providers, and exact a significant toll on the progress of economic development in the LRGV.

Though patently large, the magnitude of the disparities in the LRGV is poorly characterized, creating barriers to allocation of resources to rectify them. A major initiative into prevention of disease and improvement in health of this population is warranted, indeed is an essential investment.

In 2003, we received an NIH grant of \$7.5 Million to create the Hispanic Health Research Center of the Lower Rio Grande Valley. This new center provides a basic framework from which this cohort program can be developed. The cohort would be based in the LRGV and the HHRC would be the administrative and operation center from which the cohort program will be conducted.

There is a strong national need for studies of this type:

- The Hispanic population is the fastest growing minority in the United States
- Many diseases are substantially more frequent among the Hispanic Population, such as diabetes, obesity, and certain cancers.

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<sup>1</sup> The Border Economy, Federal Reserve Bank of Dallas, June 2001, <http://www.dallasfed.org/htm/pubs/border.html>

- The Hispanic population has only about 50-60% of the income of the average U.S. citizen, but health costs are the same, so that they pay over 20% of PI compared to 14% average in the U.S.
- The degree of health disparities is not known. For example, the recent Surgeon General report on Mental Health clearly states that the degree of mental health problems in Hispanics is not known, and furthermore the disparity in cultural and linguistically capable mental health professionals for Hispanics is so inadequate that the information is difficult to obtain.
- No longitudinal health cohort study (similar in basic concept to the Framingham study) has ever been conducted in a Hispanic population. Many diseases have different frequencies and different forms in Hispanics but few of these differences have ever been measured.

The promise of the human genome project to allow better disease prevention is becoming a reality. This project uses this and other new and powerful technology for a Hispanic population by collecting and analyzing genetic as well as behavioral, economic and environmental data for the purpose of preventing disease.

The program creates a Hispanic Health Cohort to provide accurate data on the health of the LRGV Hispanic population with key information for determination of present and future needs in planning for investment in prevention and treatment. This cohort will be large enough and sufficiently well monitored to be used to determine: precise data on prevalence and impact of important health conditions; key risk factors, accurate statistics for efficient planning and allocation of resources; and to implement and evaluate effective interventions.

No such program has ever been implemented in a Hispanic population in the United States. Objectives include:

- Measure the prevalence\rates of important health conditions,
- Establish baseline data and key risk factors for planning of interventions,
- Create a database for studying health economics in the LRGV,
- Measure interactions between health conditions,
- Establish a genetic database for gene based prevention,
- Create a GIS database for socio-geographic and environmental studies, and
- Develop, implement and evaluate individual as well as population based interventions.

Health conditions that could be addressed:

Diabetes	Obesity
Cardiovascular disease	Cancer
Environmental/occupational exposures	Infectious diseases
Neonatal/maternal	Mental health
Life style-tobacco, exercise, drugs, alcohol	Aging
Socioeconomic factors	

We are fortunate to have very capable and willing partners in this effort. These partners are The University of Texas Health Sciences Center at Houston, University of Texas Brownsville, University of Texas Dallas, our own Regional Academic Health Center.

This program will be the focal point for establishing translational research and technology transfer to the LRGV, including a local core genetic research program with high throughput gene detection (SNIP), high throughput Q-PCR, microarray chips and other biotechnology, linked to state-of-the-art bioinformatics. We envision the creation of a regional Clinical Research Center associated with The University of Texas Health Science Center at Houston, and this facility will greatly improve our ability to conduct the cohort study as well as subsequent clinical and translational research projects in our cohort as well as broader population based studies.

A mental health component has been added, designed by a faculty member (Dr. James Beale, from The University of Texas at Brownsville) with the intention of gathering pilot data on which to base population studies of mental health and neurological diseases, which are a primary focus of the University of Texas at Brownsville department of biology. Important scientific targets are pre-senile dementias, epilepsy and the contribution of anxiety and depression to diabetes and obesity and complications. Data from the first 300 of these people are now being analyzed for an early look at the time this has ever been done.

The long term benefits of this program will be broad and deep. The program will:

- reduce the burden of adverse health conditions in the LRGV.
- alter the standard of health care both preventive and curative in the population.
- create a health database for the LRGV available to all health and relevant institutions involved in resource development and health and economic development in the LRGV.
- implement programs of significant new technology, including modern molecular medicine, sophisticated public health intervention technology, and advanced communications and database creation and management.
- provide accurate information for legislative requests and future proposals, and a solid foundation for resource allocation.
- create the conditions to educate and train people in a minority region in these technologies.
- provide a conduit for the future fruits of human genome research to reach the LRGV population.
- provide a forum for regular feedback of information to the community for its development and education.

Ideally, if continuous funding can be found, this program will include the prospective study of between 1500 and 2500 people for 10 years and hopefully longer.